

# Home

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# Computing WEEKLY

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Listings for: Amstrad, TI-99/4A, Oric, Atari

Plus: news, letters, charts...

No. 88  
NOV 13-19, 1984

45p



## School phone-in

Computers are about to be making news in the field of education. Two real computer networks are to be set up which will make it possible for all Britain's secondary schools to be linked via the telephone.

The Project Information Service will be launched on 1st January 1985. Richard Hope of Perini said it has been developed from the whole of the run and will be extremely important in schools in these particular areas.

The first is at link with NECTIS, the Open University's database. This contains information about courses available at all Britain's universities, polytechnics, colleges and centres of further education.

It will also enable schools to download educational materials to the computers. Information can be exchanged. *Continued on page 4*

## Rent a game

Now you can pop in to your local video shop, hire out and home a computer game for the evening. It is about nine pence about 30p and you'll be able to borrow from a range of models games for the Spectrum and Commodore.

William Duggan, the company behind the operation, said he set up to rent this specially-written games through video outlets. Duggan, with PMS, is making available an initial range of seven titles, and aims to have reached 4,000 video outlets in the next few months.

George Armstrong, product manager, explained how the company came to be formed.

Chris Liffman, my partner, realised that there was a gap in the software market for rental through video shops. He has several concerns with one of the directors of PMS, and now we didn't want to be renting out other people's tapes, we set up a deal with PMS to release games exclusively for rental.

And William Duggan doesn't receive a share in the industry. *Continued on page 4*



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Readers we welcome your programs, articles and tips

*From front page*

according to Mr Armstrong: "That's not room for expensive, full-priced games and books now. We will be in direct competition with the budget-priced range."

One problem which immediately springs to mind is software piracy. But Mr Armstrong believes that computer games rental could help solve the problem of software theft.

"We're fighting against the whole rental thing," he said. "We're doing something as we've started piracy and we're entering for people who may want to rent a game's maintenance. In fact, a government policy will be impossible unless the games won't even be sold, so if we are getting victims for sale it will be obvious they've been illegally copied."

Mr Armstrong claims that the response to his scheme has been "overwhelming". And his launch range is only the beginning. "This is definitely an on-going situation," he said. "We're looking around for more titles and we will be expanding our range." The campaign will be backed by nationwide advertising.

Marion Alper, managing director of Mathematics, works leaders in low-cost terms, commented, "It's a kind of nonsense. They are looking to rent these tapes in 50p a night, yet a well-told problem time to get used to the game I think is 30p to rent the company will lose money because it will not earn from money to protect the rental."

He also pointed out that most people want to access a certain level of skill on their games, which usually takes some time. "To do and I think it will cost more than buying," he said.

Widley House, PO Box 44, Crawley.

## School

*From front page*

between schools through the telephone from one computer to another.

People using this sort of service will gain valuable experience in the use of new technology which will be important to them long after they leave the classroom environment. The service will also, certainly become well established in schools. The benefits of teleconferencing are too obvious to mention."

The trial in Pinner's service is called Times Network, and is

this due to be launched very soon.

Times Network offers a similar service and Steve Bacon, education adviser, said: "Now people will have to use the technology they'll want to use as they leave school for the high street of tomorrow."

So the 4,000 schools have agreed to join the scheme and it is hoped that this new network will also attract teachers who have had no experience working with computers.

Chris Kervin of Pinner said: "It's the one window in a department store. The education facilities will drive the schools in."

*Private, Pinner Woodlands, Pinner, Middlesex, Tel: 0181 824 0811.*

*Times Network, The Times, 200 City's Air Rd, London EC1E 6AE.*

## Computer deadline

THE Computer Advisory Service is a new organisation which operates a Deadline type of service with the aim of matching you with the perfect computer.

At present, 25,000 administrative questionnaires will be fed into a computer (what else?) and the computer chooses your ideal machine for you.

*Computer Advisory Service, 40 Berkeley St, Leeds LS1T 7SE.*

Exerts, crabs and volcano movies. There are more than 4,000 games, each with colourful 3-D graphics, as well as 350 digests available to test you can look all around you.

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Included in the package price of £7.95 is a full colour poster with a spell-breaker, interactive booklet and keyboard overlay. Available on the Spinning Aztec is Macintosh-compatible.

Two further releases from HM MacMillan on King Arthur's

## It's time for bed... said Zebedee

ALTHOUGH CBM owners have been abandoning for a number of years, CBM has only now officially released The Magic Remains for the Spectrum.

Based on the original TV program, written by Steve Daines, the game revolves around Daines's attempts to build a regular house. He is not helped by his fellow characters, which period is eating the super robot to get away.

CBM is promoting this game as a non-violent, arcade game — "nobody gets killed" and the game is now available at £5.95. Commodore owners will follow shortly.

*CAL, CRL, Box 9 Kings Rd, Cheltenham, Gloucestershire, GL51 7WD.*

## Import games at lower prices

SYSTEMS has popped the rights to software produced by California company Trade Three games, Monocrow, Jules and Salade Strike, will be released for the Commodore 64 in £7.95. Normal import price is £24.95.

According to System 3, most American software is released over here in the £9.95 price bracket, so this company is bringing you great value. Mark Cole, managing director of System 3, negotiated the deal with David MacLachlan of Trade Three games release the range of MSX, Amstrad and Spectrum.

Monocrow is a self-explanatory, Action + Flight + Pop-type game at which you control Salade the laser robot, while in Salade Strike you must destroy enemy order bases before they destroy you, in a Rock Paper-type game.

*System 3, Southbank Ave, Bristol France Rd, London SE1.*

*Many changes made between Jules and Salade Strike and Mark Cole of System 3.*

Quest and Gun Dogs. The two are an adventure, while Gun Dogs is an arcade game. King Arthur's Quest features 3,200-plot points, and your quest is to free the realm of its evil, most being by most dragons. Additional features include, weapons, dragons — are included.

In Gun Dogs you must shoot down flying game and guide your minecart across the landscape to reach the end. However, though there are numerous obstacles and dangers to avoid.

*HM MacMillan, 92 Fins Rd, London EC4 1FD.*

## CBM 64 BASIC

BRODER'S BASIC, for the Commodore 64 and 128, and, according to Vidson, the manufacturer, incorporates high resolution colour graphics, structured programming techniques, multi-colour graphics, user defined character graphics, music and sound synthesis and token facilities.

With 135 commands, Vidson is claiming that Broder's BASIC is the most comprehensive BASIC available for the Commodore. Available in disk and tape, Broder's BASIC runs on less than 1K, leaving you plenty of space for program development.

The program is accompanied by a manual as well as a user reference document which enables you to update your software at and when Vidson brings out new releases.

*Broder, 1 Pelican Hill, Redwood St, London W8 5UT.*





## Python saga

TERRY Jones, star of *Mindful Python*, signed copies of his computer adventure game *The Saga of Erik the Viking* at NBS, South recently.

Based on his book of the same name, the adventure is produced by Abacus Publishing.

"It's a real extension of the book, not a retelling of the story", said Terry Jones. "Playing the game, even if I don't know what's going to happen next".

Animated version of the game will be available as a cassette, while the Spectrum BBC and Commodore versions are currently costing at £9.95. Included in the price is a 70-page booklet, containing extracts from the book. *Mindful Publishing, 187 Upper St, Islington, London N7 1AQ*

Terry Jones writing his new software

## Texas special

FOUR games for the TI-99/4A have been released in time for Christmas. They are *Santa* and the Grubins, *Quadrangle* — both £7.95 — *Santa's Spirit* and *Santa's Anxels*, both £3.95.

If you are 10y to 14y old, you will receive a catalogue with the above games which is that you can see the game before you buy it. *Argonne, Cambridge Rd, Tinsley, Rost TN10 6DU*

## Duo games bonus

AMIBO is bringing out two new games — *Wings* and *Wings II* — which are available both on Commodore 64 and VIC 20. *Wings* costs £4.95 and *Wings II* costs £5.95. Both are old Commodore now available for both machines, and new releases include *Las Vegas*, *Tom Thumbs* and *Mangrove*.

Part of the reason for this promotion is that users can upgrade from a VIC-20 to a 64 and still use the same software during 26 Hour Mail. *Dorland, Kent DA1 2EL*

## Bring back the sun

ARTEC — Here for the Sun God is a battle of a new adventure game released by NBS/Mindful. It is based on one of its range of "Clowns to stretch the mind". The company claims that it is a game of imagination and logic suitable for all the family.

You can wander as well through a South American landscape of



## Santa's spree

IT MAY seem early days, but *John Macintosh* and *Merry Xmas Santa* — "an extravaganza of people action and fun" according to *John* —

Santa's task is to deliver presents to all good children. However, for his hazards to overcome, such as marauding monsters, flying snowflakes and dropping crates. But Santa has some tricks at store he has set as much cake, plum pudding and sherry in for one on his travels.

*Merry Xmas Santa* costs £3.95 on Spectrum and £7.95 on BBC/Amstrad.

*Utton* and *Wingo* are two brand new games also released by one of the same firm. Both cost £7.95 on the BBC/Amstrad. *John 63 High St, Gillingham, Tyne and Wear NE23 4AA*

## Steve Davis stars on your screen

SHOOTER superstar Steve Davis has signed a contract with CDS to produce a new shooter game. *Steve Davis Shooter* for the Spectrum is Micro-processed, non-violent and follows on the back of *Pool*. CDS wants that it spent a considerable amount of money on researching and developing the game, and *Mick*

*Lamb*, author of *Pool*, wrote the program.

Features include eight previous *Snooker* accurate by definition type, infinitely variable speeds and highly realistic table. Commodore 64C and MQX releases are scheduled for release soon, and the Commodore version will also be Microspeed-compatible.

To make the launch CDS will be running a snooker competition, while *Steve Davis* will be making three personal appearances in chess moves to promote his games.

CDS Silver Air Silver St. *Dovercourt DNV 1WL*

## Stocking filler

HERE IS an idea for stocking-filler — if Father Christmas can afford £11.95, that is the *Real* home computer starter kit. What you get is a cassette, demo, printer and printer, a variable-speeding solution, program and a good and point, and complete.

Packed in a PVC wallet with full instructions, the kit "contains all the bits and pieces needed to

organise, operate and maintain a cassette drive system". according to *Real*. *Real, Gloucester Rd, Acton, Bucks HP9 1JY*

## Briefly

Argonne is moving into business software with its Professional Series for the Commodore 64. There are three new releases: *Micro Memo Database*, *Micro Swift Spreadsheet* and *Micro Wonderful Word Processor*. At £29.95, £19.95 and £24.95. Argonne is making that these programs are a price break-through in business software, making it possible, for the first time, for home users to enjoy the benefits and convenience of the computerised office.

*Argonne, 29 Salford Industrial Park, London Rd, Reading, Berks RG6 1AZ*

THE Scottish Home Computer and Electronic Show will be held at the Anderson Exhibition Centre in Glasgow from Friday November 19 to Sunday November 21. It is the second year the exhibition has been held, and Argonne will be displaying its Plus software. A computer swap shop will be held, and visitors cost £3 for adults and 50p for children.

*Scottish Home Computer and Electronic Show, Anderson Exhibition Centre, Glasgow G2 7PA*

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COMMODORE 64



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## Track down that money

**LAUNCHED** at a champagne breakfast on October 31, *Cardinal* is an adventure game with the incentive of a £15,000 prize at the end of it. Released by Danmark, the game involves the adventures and the ultimate aim is to discover the mystery telephone number — that this number and you will all the money.

Danmark is a new company formed by Dominic Whitley and Mark Sweeney, and has its background in advertising. An extensive national promotional campaign will no doubt stir up public interest. The company claims that *Cardinal* will occupy well over 300k of memory, making it the largest computer game ever sold in this country.

At the launch a French version was being displayed and the game will also be marketed in the USA, Canada and Europe. Available on the Spectrum and Commodore, *Cardinal* costs £14.95 on tape and £16.45 on disc. Danmark, 228 Avenue Rd, London W19 9JQ.



Danmark: It's got all money

## You could be on our pages

We welcome programs, articles and tips from our readers. If you feel that your work meets our standards, please submit it to us for consideration for publication.

- Programs must always be sent on cassette. Listings are helpful, but not necessary. Check carefully that there are bug-free.

Include details of what your program does, how it works, variations you have used and hints on conversion.

- Articles on using home computers should be no longer than 3,000 words. Don't worry about your writing ability — just try to keep to the style in HCW. Articles most likely to be published will help our readers make better use of their money by giving useful ideas, possibly with programming examples. We will convert any sketched illustrations into finished artwork.

- Tips are short articles, and brief programming routines. Your hints can aid other computer users.

All submissions will be acknowledged and the copyright in such works which will pass to Argus Specialist Publications Ltd will be paid for at competitive rates.

Keep a copy of your work and include an SAE label everything clearly and give a daytime and home phone number if you can.

All work for consideration should be sent to:

Paul Liptrot, Home Computing Weekly, No. 1 Goulton Square, London W1R 3AB

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ASA Ltd, Dept 3 Brook House, Tinsgreen Place, London WC1E 7JN

The space indicated in the corners of high standards of advertising.



# by numbers

```

100 IF C#="D"OR C#="K"OR C#="T"THEN C=3
110 IF C#="C"OR C#="L"OR C#="U"THEN C=3
120 IF C#="B"OR C#="R"OR C#="V"THEN C=4
130 IF C#="E"OR C#="M"OR C#="W"THEN C=5
140 IF C#="F"OR C#="Q"OR C#="X"THEN C=6
150 IF C#="S"OR C#="P"OR C#="Y"THEN C=7
160 IF C#="H"OR C#="D"OR C#="Z"THEN C=8
170 IF C#="I"OR C#="R"THEN C=9
180 B=B+C
190 C=B
200 NEXT I
210 IF C=18 THEN 410
220 IF C=19 THEN 430
230 T=INT(5/T80)
240 B=B-(2+100)
250 T=INT(5/T80)
260 T=2+T
270 B=B-(10+T)
280 T=T+8
290 IF T=18 THEN 420
300 T=INT(T/18)
310 B=B-(2+100)
400 T=T+83:GOTO 420
410 T=0
420 CLR
430 PRINT#4," 999
440 PRINT #96," YOUR LUCKY NUMBER IS "T
450 PRINT #33," THIS SHOWS THAT YOU ARE"
460 CH(1)=" A CLEVER THINKER AND A LOVELY
0 VERY SPONTANEOUS."
470 CH(2)=" A CAUTIOUS, HARDWORKING TYPE
480 CH(3)=" AM EXTROVERT AT HEART. GREAT
IT LATE."
490 CH(4)=" A RELIABLE, CALM PERSON. YOU
BARGAIN AND ZEALOUS"
500 CH(5)=" A HOT-HEADED PERSON AND VERY
ENVIOUS OTHERS."
510 CH(6)=" A LOVER OF PEACE AND QUIET.
OTHERS."
520 CH(7)=" A DREAMER AND A LOVER. BUT
ILLANT."
530 CH(8)=" A DETERMINED PLANNER, OFTEN
FINALLY SUCCESSFUL."
540 CH(9)=" A TOLERANT AND COMPASSIONATE
WELLER."
550 PRINT#(T)
560 PRINT:PRINT:PRINT" DO YOU WANT ANOTHER REPLY,NO"
570 ANSWER$:IF AN="" THEN 70
580 IF AN="Y" THEN 110
590 IF AN="N" THEN END ELSE 570
600 CLR:PRINT # 42,"numerology"
610 PRINT:PRINT" NUMEROLOGISTS CLAIM THAT YOU CAN DISCOVER A LOT ABOUT
YOUR CHARACTER BY USING THE ANCIENT SCIENCE OF NUMBERS. USING METHODS
KNOWN TO THE ANCIENT CHINESE, THIS PROGRAM WILL CALCULATE YOUR"
620 PRINT" PERSONAL NUMBER AND THEN GIVE YOU A CHARACTER ANALYSIS"
630 PRINT:PRINT" press any key to continue"
640 SCREEN 0:1
650 ANSWER$:IF AN="" THEN 600
660 RETURN

```



# WILDEST DREAMS

## Software Rental

Just a couple of questions for the computer gamer ....

1. When did you buy your last computer game?
2. How often have you played it?



Buying software can seem a pretty bad deal when you pay £5.99 for only a couple of hours play.

Well, now you can visit the Circus, help King Clive in his dungeon, beat the computer on your Laser Byke, explore deep space, eat your way through a cheese warehouse and get totally infuriated by the Marshall, all for less than the price of one new cassette.

How? well, if you go down to your Video dealer today, you're in for a big surprise. He can hire you a Wildest Dream rental cassette for your Spectrum or Commodore 64, featuring one of these games, at a very reasonable price (say about one tenth the price of a good recent game ...)

And its not somebody else's old stock were trying to lure you. These are all brand new games that you've never seen before in the shops - and you won't see them in the shops later.

Only through your local Video dealer can you hire Wildest Dreams rental software.



**CONTACT:- Chris Kilburn**  
**WILDEST DREAMS**  
**P.O. BOX 84,**  
**COVENTRY.**  
**Tel: (0203) 663085**



[illegible]







One of the biggest problems faced by programmers is software piracy. Consequently, a number of tricks are used to foil the copying and emulation of software. I thought it might be of interest to describe some of the techniques whippers.

First, the bad news. It is impossible to prevent copying of character-based software using audio methods; can be used. Assuming that the opposite is not going to use such methods, there are several ways with which you can protect your software.

The most impractical program is obviously machine code. It can, however, be disassembled — or run at. There are classes of codes, not implemented on the 6502, which, when used, perform simple jumps. Normal disassemblers cannot handle non-standard op codes, so this is one way of keeping prying eyes out of your code.

Many programmers use BASIC which, unfortunately, is easy to look at. The more it is, the more it is to use a trick to prevent listing of the program by some means. One common method is to disable the RUN/STOP and RESTORE buttons to prevent access to the source. To work effectively, however, such measures must be used with an effective reset.

OK, so how do we disable the real key? The usual trick is

**POKE 204,104**

This moves the 840 vector so that the RUN/STOP is not checked. It has the disadvantage that the jiffy clock is stopped and it cannot be used if you have an address window activated. A better trick is

**POKE 804,144**

This moves the "Test STOP" vector and has no party side-effects (except preventing listing which we want anyway). The RESTORE button can be sorted with

**POKE 3700,1**

OK, you've sorted the keyboard. Now come the timer tricks. The map key vector (which is one way, the other is

**POKE 715,200**

This moves the 'press release' link. I've often heard that changing the BASIC link type is a good technique. This will certainly make the program un-BASIC, but since BASIC is

# How to protect your programs

**Software piracy is a threat to all programmers. There are a number of tricks of the trade which will help make life harder for the software thief — Allen Webb lets you in on some of the secrets**

reboot on loading, this method has limited value.

Auto running a program is a handy technique. Some software sets a machine code routine which sets on page 1 and when the BASIC warm start and thus force code that I won't give details since it would be rather as the software houses concerned. A simpler method is a small machine code routine for BASIC using immediate bytes to push all the characters a key for SHIFT/RUN/STOP and the keyboard buffer.

**+G POKE 6H,131 POKE 10H,1**

This will load and run the test program on the tape. The best way of making software difficult to crack is to use several programs each containing the next. This would normally check in some way that the previous program has been run.

Program 1 machine code kills RUN/STOP and RESTORE, prints a code in RAM and sets runs program 2.

Program 2 BASIC checks that the control code from program 1 is in RAM and runs with program 3. Program 3 has not been run.

Add a column vector and add type BASIC. Type two sets of spaces and press insert once for every character in the line, including the spaces (in this case 17 spaces). Press delete the same number of times and press return. Now test the line.

If there runs with loading of further programs as required in then runs with loading of further programs as required.

The test of scheme breaks down if program 1 is loaded but not run. Clearly you must hide the lines which check for the hidden code in some way. Enter the executable line. This type of line runs directly embedded in a BASIC program itself on loading. A message is often added to alert the deception. Consider the line

**10 SYS(1024)**

One last provision is to prevent copying. The result is an invisible character at the foot of the name under which the program is saved. Any non-printing character string will do, e.g.

**00 = CHR\$(255) + "Broom".**  
**SAVE 00**

On loading, location 00 will contain the first character. You can therefore test to see if the program name is correct. This will trap any manual copying made by the inexperienced.

These techniques cannot guarantee protection, but they make life rather difficult.





# AMSTRAD PROGRAMMING

```

440 NEXT n
450 PEN 6:LOCATE 1,3:PRINT "PLEASE LOCATE 2,6:PRINT "END":GOSUB 1200
460 PEN 6:CLS:LOCATE 1,3:PRINT "CORRECT":PRINT "PATTERN"
470 GOSUB 330:GOSUB 1200:GOSUB 890:GOTO 110
480 REM Play sequence
490 PEN 6:CLS:LOCATE 1,3:PRINT "FOLLOW":PRINT " THIS ":PRINT "PATTERN"
510 length=length+1:box=length-8:box1=length-8:box2=length-8+1
520 GOSUB 1200:GOSUB 1100
530 FOR n=1 TO length
540 number=box(n)
550 SOUND 1,note(number),999,7:DNK number,colour(number)
560 FOR pause=1 TO level:100:NEXT pause
570 SOUND 129,6:DNK number,9
580 FOR pause=1 TO level:10:NEXT pause
590 NEXT n
600 RETURN
610 REM Initialisation & key definitions
620 DEFINT a-z
630 DIM box(255),note(16),colour(16)
640 FOR n=1 TO 4
650 READ colour(n),note(n)
660 NEXT n
670 MODE 0
680 BORDER 0:DNK 0,0:CLS
690 WINDOW 81,7,13,1:8
700 WINDOW 40,1,4,9,17
710 WINDOW 40,14,20,9,17
720 WINDOW 44,7,13,16,25
730 WINDOW 40,7,13,9,17
740 FOR n=1 TO 5
750 DNK n,9:PAPER #n,0:CLS #n
760 NEXT
770 DNK 3,0:INK 4,4:DNK 7,0:INK 8,24
780 WINDOW 840P 3
790 PLOT 0,127,8:DRAW 439,127:DRAW 439,272:DRAW 0,272:DRAW 0,127
800 PLOT 170,377:DRAW 416,377:DRAW 416,0:DRAW 170,0:DRAW 170,377
810 PEN 6:CLS:GOSUB 1300:LOCATE 3,2:PRINT "PRESS":LOCATE 3,6:PRINT "ON"
820 PEN 7:LOCATE 2,4:PRINT "COPY":LOCATE 2,8:PRINT "FIRE"
830 RANDOMIZE TIMER:length=0:fire=7:copy=9:off=-1:press=0
840 IF (INKEY)=fire:off AND (INKEY)=off THEN GOTO 920
850 IF (INKEY)=fire:press THEN off="FIRE":off=fire:up=72:down=73:left=74:right=75
860 ELSE off="COPY":off=copy:up=0:down=2:left=8:right=
=1
870 PEN 6:CLS:LOCATE 2,4:PRINT "LEVEL":level=0
880 PEN 7:GOSUB 1300:LOCATE 3,8:PRINT off:PRINT "UP,DOWN"
890 WHILE (INKEY)=off
900 IF (INKEY)=up:press THEN level=level+1:IF level>7 THEN level=7
910 IF (INKEY)=down:press THEN level=level-1:IF level<1 THEN level=1
920 PEN 7:LOCATE 2,8:PRINT level
1000 END
1010 RETURN
1020 REM Title screen
1030 CLS:PEN 7
1040 LOCATE 1,4:PRINT "AMSTRAD"
1050 LOCATE 2,6:PRINT "SONOM"
1060 RETURN
1070 REM Process routine & score
1080 GOSUB 1300
1090 PEN 7:LOCATE 2,8:PRINT off
1100 PEN 9:LOCATE 2,9:PRINT length
1110 IF (INKEY)=off THEN 1230
1120 RETURN
1130 REM Fingers off
1140 IF (INKEY)=press THEN 1300
1150 RETURN
1160 REM Colours, sounds & ratings
1170 DATA 24,100,4,300,2,500,19,700
1180 DATA " FOUR"," 50-50"," AVERAGE"," GOOD","V. GOOD"," SUPERB"," ACE"

```





# No.3 QUICKSILVA

## Computing SECTION

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# Meteor

Dodge the meteors to dock the ship in this fast-moving game  
written by Martin Gohrey

As commander of a space vessel in the depths of a peril-filled galaxy you must manage to dock your craft with the mothership.

Sounds easy? It would be if it wasn't for the meteors. They come thick and fast and a requires all your experience of commanding spacecraft to achieve a successful docking while dodging the air-raiding meteors.

If you're really skilled and manage to achieve the high score then you also have the chance to save your name. Use S for right and O for left.

So have a good look out for the meteors.

**Variation**  
A,B,D meteor speeds  
SC,BC score and high score

**How it works**  
110-119 set variables  
120-129 initialise characters  
130-139 print title screen  
140-149 set up game screen  
150-159 ready status  
160 display score  
170-179 check for key and  
response  
180-189 move left mouse  
190-199 move right mouse  
200-209 continuous check  
210-219 docking check  
220-229 game over routine  
230-239 end variables  
240-249 screen game  
250-259 successful docking and  
speed up

```
100 CALL CLEAR
110 HC=0
120 SC=0
130 D=18
140 B=15
150 A=10
160 CALL CHR$(99,"3CTEB5TE9C")
170 CALL CHR$(42,"000814DSL00000
00")
180 CALL CHR$(97,"00043R418EB24C
30")
190 CALL CHR$(98,"FF3DE7FF0AFFAS
5A")
200 CALL CHR$(96,"00020505")
210 FOR D=1 TO 12
220 CALL NOTION(11,0,0)
```

```
230 CALL COLOR(0,16,2)
240 NEXT D
250 CALL COLOR(0,13,1)
260 CALL CLEAR
270 CALL SCREEN(2)
280 DISPLAY AT(2,6)BEEP:"METEOR
ATTACK"
290 DISPLAY AT(4,12)BEEP:"BY"
300 DISPLAY AT(6,7)BEEP:"M.GOHRE
Y 1984"
310 DISPLAY AT(8,2)BEEP:"THE AIM
OF THE GAME IS"
320 DISPLAY AT(10,4)BEEP:"TO DOCK
YOUR SPACECRAFT"
330 DISPLAY AT(12,3)BEEP:"WITH T
HE MOTHERSHIP BUT"
```



# attack

```

340 DISPLAY AT(14,4):BEEP:"RNDID
THE METEORS!!!"
350 DISPLAY AT(17,4):BEEP:"PRESS
ANY KEY TO BEGIN"
360 CALL KEY(O,K,S):: IF S=0 THE
N 360
370 CALL CLEAR
380 CALL SCREEN(2)
390 CALL HCHAR(23,1,42,32)
400 CALL SPRITE(#28,98,3,1,120,0
,12)
410 CALL SPRITE(#1,96,14,170,120
)
420 CALL SPRITE(#2,97,7,10,10,0,
-6)
430 CALL SPRITE(#3,97,5,20,50,0,
0)
440 CALL SPRITE(#4,97,15,40,100,
0,0)
450 CALL SPRITE(#5,97,7,60,1,0,-
6)
460 CALL SPRITE(#6,97,5,70,10,0,
6)
470 CALL SPRITE(#7,97,15,70,50,0
,6)
480 CALL SPRITE(#8,97,5,130,1,0,
0)
490 CALL SPRITE(#9,97,7,130,100,
0,0)
500 CALL SPRITE(#10,97,15,140,50
,0,-8)
510 CALL SPRITE(#11,97,7,150,80,
0,0)
520 CALL SPRITE(#12,97,5,160,30,
0,-8)
530 CALL SPRITE(#13,97,5,50,1,0,
0)
540 CALL SPRITE(#14,99,12,90,1,0
,28)
550 CALL KEY(O,K,S):: IF S=0 THE
N 550
560 DISPLAY AT(24,1):"SCORE ":SC
:: DISPLAY AT(24,12):"HI ":HCH
-" :: DISPLAY AT(24,19):RS
570 CALL KEY(O,K,S):: CALL COINC
(ALL,C):: IF C=-1 THEN 720 :: CA
LL MOTION(#1,-7,0):: IF S=0 THEN

```

```

630
580 IF K=68 THEN 630
590 IF K=83 THEN 610
600 GOTO 570
610 CALL MOTION(#1,-7,-7)
620 CALL COINC(ALL,C)
630 IF C=-1 THEN 720
640 GOTO 570
650 CALL MOTION(#1,-7,7)
660 CALL COINC(ALL,C)
670 IF C=-1 THEN 720
680 GOTO 570
690 CALL COINC(ALL,C)
700 IF C=-1 THEN 720
710 GOTO 570
720 CALL COINC(#1,428,15,C)
730 IF C=-1 THEN 860
740 CALL SOUND(1000,-5,0)
750 CALL DELSPRITE(#1)
760 DISPLAY AT(12,6):BEEP:"GAME
OVER"
770 DISPLAY AT(14,7):BEEP:"PRESS
ANY KEY"
780 B=18
790 B=15
800 R=10
810 IF SC=HC THEN 930
820 SC=0
830 CALL KEY(O,K,S):: IF S=0 THE
N 830
840 GOTO 360
850 GOTO 850
860 R=R+1
870 B=B+1
880 D=D+1
890 SC=SC+1
900 CALL SOUND(100,110,0)
910 CALL SPRITE(#1,96,14,170,120
,0,0)
920 GOTO 550
930 HC=SC
940 DISPLAY AT(13,17):"YOU PASS.
No.1 ENTER YOUR
NAME"
950 ACCEPT AT(24,19):BEEP:RS
960 GOTO 820

```



# How to use Atari operating system

**This technical article by Frank O'Dwyer, shows you how to use your operating system to send and receive data. You'll need an Assembler/Editor cartridge**

One of the things inexperienced beginners find most baffling when they write programs in assembly language is input/output. It's pressing text to a screen, reading from the keyboard or cassette, and so on. On some computers, you have to read books and magazines until you find out the address of a ROM subaddress which you can call to do the job you want to do. However, what happens if a new version of the ROM is brought out and your ROM address is now at a different address? It's tough luck if your program was a best selling game, as it won't run on the new ROM.

Some computers, namely Atari and Commodore, get around this problem by featuring a virtual operating system to take care of input/output. On such machines all you need do is connect a "channel" to the device of your choice (say the screen). Then you read or receive characters using this channel and the virtual operating system makes sure that these characters are sent to (or come from) the appropriate device (the screen in this case).

The beauty of this system is that you can write a program without regard to what an input will come from, or where an output will go. Once your program has it's a word processor it writes it's a tape, a matrix of connecting the channels to the appropriate device (so your output may go to other users or printers, and your input may come from reader keyboard or disc, for example).

This article explains how to use the Atari virtual operating system (called CIO, for channel input/output) to read and receive data to and from devices (screen, cassette, etc.) from assembly language. Some users of you will already be familiar with Atari BASIC, but it is clear that as a starting point, you should know, however, that CIO must be part of BASIC (in fact it is a prerequisite to use CIO without BASIC or any other cartridge in place). There is, however, a great similarity between some BASIC's PUT and GET commands and the way CIO works. This isn't surprising really, since BASIC uses CIO for these commands.

For those who want to translate the following BASIC to assembly language:

```
10 CLOSE #1: OPEN #1,
    "E": REM OPEN A
    CHANNEL TO THE
    SCREEN EDITOR
20 PRINT #1,"SOME
```

```
TEXT": REM PRINT A
    STRING TO THE
    SCREEN
30 CLOSE #1: REM CLOSE
    THE CHANNEL, SINCE
    WE'RE FINISHED
```

The code to CLOSE a channel is given in Listing 2, but first look at Listing 1 and Table 1. Listing 1 is the start of the assembly language equivalent to the BASIC program and defines the appropriate constants for use with CIO. The entry point for CIO is \$D436. Table 1 shows the command codes for the operation CIO can perform (close channel, open channel, get characters, etc.). These are the same as BASIC's XIO command values, and it's worth looking up the BASIC manual for clarification (especially on the FILE command).

Line 1040 of the code to CLOSE a channel (Listing 2) designates the channel to use. CIO denotes channel one, \$D0 channel two, \$D0 channel three, etc. It is essential that the X register is used for this since CIO expects the channel number in the X register. Line 1060 loads the accumulator with the command code for "close channel" and line 1080 stores this in the command code location for channel 1. Line 1100 actually calls CIO to close the channel.

Now we need some code to OPEN a channel. Listing 1 does this. Again, the X register is loaded with the channel number (\$D0 since we are using channel 1). Line 1140 loads the accumulator with the command code for "open channel" and line 1160 stores it in the command code location (below CIO will look for it). Lines 1180 to 1190 store the "E" and "0" from OPEN #1,"SOME" and

the special locations reserved for this purpose.

Designating the device code ("E") is a little more tricky. First, we must set up the string "E" in memory. This will be done later on in the program, for now assume that the place where this happens is labelled NAME in the Assembly language. Next, we must store the low and high bytes of the address of this string in the special CIO locations used for this purpose. Lines 1200 to 1230 do this. Finally, line 1240 calls CIO to do the OPEN.

Finally, we must PRINT the string "SOME TEXT" to the channel and close the channel again. Listing 4 contains the assembly language to do this. As always, the X register is loaded with the channel number. Line 1260 loads \$D0 and 1280 actually calls CIO to "Put a text record". This requires some explanation. A text record differs from a binary record in that it may be terminated by a carriage return (character code 13). With a binary record, exactly the number of characters you request are output from your string, so if you say there are 20 characters in your string then 20 characters will be output regardless of how many carriage returns are present.

With a text record, if you say there are 20 characters in the string then up to 20 characters will be output, each output stopping at there is a carriage return in the string. It is often handy to say there are 65535 characters in a string, and to terminate it with a carriage return, since a safety is having to count the characters.

Lines 1290 to 1330 save the address of the string (or text record) and the buffer address located by CIO, while

line 1340 to 1360 calls CIO to do the donkey work of copying to the string. Lines 1380 to 1400 close the channel as before. The CIO command is simple to learn control to the monitor when the program finishes if you are using the Atari Assembler/Editor cartridge. It should have a similar effect with any monitor program for machine language. If you want to try the example and just assemble it to page 61, 6600, and type the following commands while in the Assembler/Editor cartridge:

```
PGO (to enter monitor)
CROD (to run machine language)
```

The example program sends the string to the screen using device 1 ("E"), but it is just an entry to send it to cassette ("C") or a screen test mode ("S"). Simply change the device name string to "C" or "S", or any other device name as appropriate.

To input data from a device, use the same approach, except instead of giving CIO an address of a string to output you give it the address of a memory area where you want CIO to put the characters it gets from the device. Naturally, you also use the command code for "get text record", etc. rather than the code for "put text record", etc. Also, you would use a 4 instead of an 8 when translating OPEN #1,"E",16 to indicating that you want to do input instead of output.

In fact, the OPEN command (and its assembly language equivalent) allows you to do more than select whether you want INPUT or OUTPUT. The parameters AUX1 (corresponding to the 8 in OPEN #1,"E",8) allow you to specify options on a particular device.

For example, if you are using the screen ("S") then AUX2 lets you specify the graphics mode you want to use, allowing you to switch graphics modes from machine language! See Table 2 for a complete list of effects possible with AUX1 and AUX2.

Finally, a few miscellaneous notes on using CIO. When you call CIO, using \$D0 CIO the next may arise which the operation you want to do is

# ATARI PROGRAMMING

transportable from a large, remote  
base, on the water side of the river,  
at range on the opposite. In this  
case, BAYSA would give you an  
easy way to transport.

Machine languages has no error messages, however, so CRO will return a 'status code' to you in the form of a number. The code in the table below gives you the meaning of the status code. The code 000000 means that you are doing it all right in the BASIC manual, so for example if the output turns out to be wrong then it's probably not the BASIC manual, but the program. The code 000001 means that you've got a way of error checking, especially useful when testing your code, or comparing what the error codes are against what the manual says you can get for errors using the 8080's BSR.

Command codes 7 and 8 (put/get character) are often useful. To use them, store 0 in the string length location. To PUT a character, load the accumulator with the character you want to output and PUT CMO. To GET a character, GET CMO and the character will be in the accumulator upon return.

When working with graphics, modes are entered to tell the model how you want to draw. You can choose to draw characters to a device (rather, you are sending COLOUR data to the screen). So sending a 2 to the device will cause the next PLOT command to be PLOT2D. This is similar to writing an BASIC COLOUR 2 PLOT N, except that you can't easily decide N and Y. It was used to plot a particular N,Y coordinate first, as indicated in the Location 94 table. The next Y co-ordinate can be plotted (or generally, wait 95 and 96 hold the N co-ordinates in line with the Y co-ordinates).

Simply enter the co-ordinates you want to **FLY** on the **Y-axis**, then send the colour you want to plot in to the driver using **CMD**. Upon return, the **X**-coordinate will have been automatically incremented so that the next time you plot you may not need to enter the **X**-coordinate. Note also that sending a **ESC** to the driver will clear a

```

0000  COMMAND=1002
0000  SOURCE COMMAND
LOCATION
0000  COMMAND=1004
0000  SOURCE BUFFER ADDRESS
0000  BUFFER=0000 SOURCE
BUFFER LENGTH
0000  ALG=0000 SOURCE
ALG/16 BYTES I
0000  ALG=1000 SOURCE
ALG/16 BYTES I
0000  CDS=0000 CDS ENTRY
COUNT

```

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 214. **Figure 205**  
 215. **Figure 206**  
 216. **Figure 207**  
 217. **Figure 208**

```

1090 LEX #D0 ;not changed
1091
1092 LEX #D2 ;not to close a
      channel
1093 SET A COMMAND-AND-N ;not
      to command location for
      channel 1
1094 SET #A CND and CND-to close
      channel

```

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

```

1100 LDA #0, index channel
1101 and
1102 LDA #0, index for open
1103 STA CHANNEL_0, store
1104 on command channel for
1105 channel 0
1106 LDA #0, #0 is OPEN
1107 STA_0
1108 STA_ADR_0 store in
1109 memory
1110 LDA #0, #0 is OPEN
1111 STA_0
1112 STA_ADR_0 store in

```

1000

[illegible]

**Training**

Fig. 1. (a) Schematic diagram of the experimental setup. (b) Photograph of the experimental setup.

[illegible]

**Table 1**  
AUC and AUC<sub>95</sub> values  
for the 1000s

LINE	Machine	Programmer
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3	3	3
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100	100	100

12	volume	legitimate concern and not to be condemned
13		negative impact and cost

**Keyboard:** **mod**

1. **REASON** converted word  
 2. **REASON** black word  
 3. **REASON** converted word  
 4. **REASON** common third row  
 5. **REASON** and word

**I** **mean:** when you're, the  
and is under,  
under

about screens, the  
area "under"  
and "over"

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398</
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[illegible]

1. **Author:** John Doe  
 2. **Title:** The Great Gatsby  
 3. **Year:** 1925

17	primary	secondary	total
18			
19	normal	normal	

4-11	SCHEM	selects graphics mode
------	-------	-----------------------

ADT systems for clear screens





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## HARVARD COMMUNICATIONS PROGRAM 13 November 1984 Page 32





# PROGRAM

```

& GO SUB 3000
@ LET f=0: LET aa=0: LET p=0: LET y=0: LET go=0: LET x=1: LET a=27: LET n=0
LET h=120
* BORDER 0: CLS
10 REM
11 REM GRAPHICS
12 REM
13 REM A B C D E F G H I J K L
14 REM 0 1 2 3 4 5 6 7 8 9 10 11
15 REM
16 REM M N O P Q R S T U
17 REM 0 1 2 3 4 5 6 7 8 9
* 18 REM
19 PRINT INK 1:AT a,y: "J" INK 0: PRINT AT a,y: "J"
20 INK 2: FOR a=2 TO 24 STEP 3: FOR b=11 TO 16: PRINT PAPER 4:AT b,y: "0"
X
T 2: NEXT a
30 INK 4: FOR a=17 TO 20: FOR b=0 TO 3: PRINT AT a,b: " " NEXT b
40 FOR b=0 TO 3 STEP 1: PRINT AT 14,b: " " NEXT b
45 INK 0: FOR b=0 TO 3: PRINT AT 23,b: " " NEXT b
50 INK 1: FOR a=14 TO 25: PRINT PAPER 4:AT 13,y: "0" NEXT b
60 INK 4: PRINT AT 13,0: " " AT 14,0: " " AT 13,3: " " AT 14,3: " " AT 13,2: " " AT 14,2: " " AT 13,2: " " AT 14,2: " "
65 PRINT INK 0: PAPER 4:AT 17,0: "0"
70 INK 4: PRINT PAPER 2:AT 12,0: " " AT 14,2: " " AT 14,2: " " AT 14,2: " " AT 13,3: " "
Pa
FOR 7:AT 13,1: " " AT 15,3: " " AT 15,3: " " AT 13,3: " " AT 14,4: " " AT 14,2: " "
80 INK 2: PRINT PAPER 4:AT 10,0: "0" AT 10,2: "0" AT 11,0: "0" AT 11,2: "0" AT
2,2: "0" AT 13,2: "0" AT 11,3: "0" AT 11,2: "0" AT 12,2: "0" AT 13,2: "0" AT 10,
27
I "000"
90 INK 2: FOR a=1 TO 27 STEP 3: PRINT AT 11,a: "0" NEXT a
100 INK 0: PRINT AT 0,0: "0000 DIST10 POT22 BRACK 0 YW
VERBEX BELOW 0 LEVEL OF MEN 00
COPPER TRAIN SET 99"
105 PRINT AT 4,27: "0=10=Sheet"
110 PRINT INK 2:AT 4,7: " " INK 1:AT 4,13: " "
115 PLOT 0,132: DRAW 225,0
117 PLOT 177,132: DRAW 0,14
119 PLOT 41,147: DRAW 224,0: PLOT 41,147: DRAW 0,3: DRAW -41,0
114 PLOT 0,133: DRAW 0,42: PLOT 225,175: DRAW 0,-42
115 PLOT 1,144: DRAW 75,0: DRAW 0,3: DRAW 34,0: DRAW 0,-3: DRAW 110,0: DRAW 0,-
4: DRAW 23,0: PLOT 113,143: DRAW 0,13: PLOT 113,144: DRAW 0,7
114 PLOT 47,144: DRAW 0,11: PLOT 147,144: DRAW 0,11
20 INVERSE 0: OVER 0
500 LET go=go+1: IF AND(.99 THEN GO SUB 3000
501 IF go=1000 THEN GO SUB 3000
502 IF INKEY="a" OR INKEY="2" THEN LET h=h-1: LET k=0: GO SUB 330
503 IF INKEY="b" OR INKEY="4" THEN LET h=h+1: LET k=1: GO SUB 330
504 IF h=11 THEN GO TO 500
505 IF INKEY="c" OR INKEY="1" OR INKEY="5" THEN GO SUB 4000
507 IF INKEY="w" OR INKEY="2" THEN DO TO 520
510 GO TO 500
520 PRINT AT 7,y+1: " " AT 8,y+1: " " AT 7,31: " " AT 8,31: " "
521 PRINT AT a,y: " " LET y=y+1: IF y=1 THEN LET y=0
522 PRINT AT 0,3:y: IF y=10 THEN PRINT AT 0,3: "0" y
524 PRINT INK 1:AT x,y: "J"
525 PRINT AT 0,11:y-(a+1): IF y-(a+1)=0 THEN PRINT AT 0,12: " "
526 IF y-(a+1)=10 AND y-(a+1)=10 THEN PRINT AT 0,13: " "
527 IF y-(a+1)=10 AND y-(a+1)=10 THEN PRINT AT 0,12: " "
528 PRINT AT 0,18:a+1: IF a=10 THEN PRINT AT 0,18: "0" a+1
529 IF f=1 THEN PRINT INK 2:AT 0,30: "0"
530 IF f=1 THEN PRINT AT 7,y+1: " " INK 2: PAPER 4:AT 0,y+1: "0"

```

```

531 IF x=0 THEN PRINT INK 1;at 0,50;" "
532 IF ATN(10,y)=50 THEN GO TO 534
533 PRINT INK 1;at 3,11;" " GO TO 535
534 PRINT INK 2;at 2,11;" "
535 PLOT INK 2;y,144; PLOT INK 1;x+1,142
537 IF y=0 THEN GO TO 540
538 PLOT INVERSE 1;y-1,144; GO TO 541
540 PRINT at 3,3;" "
541 FOR a=31 TO a+2 STEP -1: PLOT INVERSE 1;a,142; NEXT a
542 GO TO 550
550 IF n=100 THEN LET n=119
551 IF n=100 THEN GO TO 540
552 PLOT INK 0; INVERSE a;y=8+12,n
553 FOR i=1 TO 10: NEXT i
554 IF n=100 THEN PRINT at 0,y+1;" "
555 PRINT at 2,28;119-n; IF 119-n=100 THEN PRINT at 2,28;"0";119-n
556 IF x=0 THEN GO TO 539
557 LET n=100
558 RETURN
559 LET n=104
560 IF y=1 THEN PRINT at 0,y+1; INK 2; PAPER a;"0"; LET x=1
561 GO TO 531
1000 DATA 119,119,119,0,119,119,119,0,255,255,255,103,153,255,255,255,127,127,
7,127,127,255,255,255,254,255,255,255,254,254,254
1010 DATA 0,128,234,240,248,252,254,255,1,1,3,7,31,63,127,255,219,214,33,224,192,
192,128,128,219,31,7,4,3,3,1,1
1020 DATA 255,33,255,254,254,248,144,252,7,140,63,179,31,19,0,1,0,0,119,124,112,
255,127,63,1,7,15,31,63,63,124,248
1030 DATA 0,64,74,255,255,255,109,109,0,224,128,158,158,255,102,102,126,126,126,
126,126,255,102,102
1040 DATA 0,0,0,0,224,252,254,255,0,0,28,254,255,255,255,255,0,0,0,1,7,63,127,
59,1,7,7,15,15,31,63,255,128,224,224,240,240,248,252,255
1050 DATA 16,16,16,16,16,16,16
1060 INK 0
1070 BEEP .55,0; BEEP .55,5; IF ATN(10,x-1)=50 THEN LET x=1; GO TO 1002
1080 LET a=0
1090 IF ATN(19,a-1)=50 THEN GO TO 1095
1100 INK 0; LET g=a+105-CHASHEAT; IF a=0 THEN GO TO 1500; LET a=a-1; PRINT at
a,a;"CH0 "; RETURN
1110 IF a=0 THEN GO TO 1500
1120 LET a=a-1; PRINT at a,a;"CH1 "
1130 IF a=-1 THEN GO TO 1099
1140 PRINT at 9,a;" "; PRINT at 10,a;"CH2 "
1150 FOR a=10 TO 14; PRINT at a,a;"CH3"; FOR i=1 TO 20; NEXT i; PRINT at a,a;"
"; NEXT a
1160 PRINT at 14,a;"CH4"
1170 FOR i=1 TO 10; PLOT a+a=4,49; DRAW INK 2;y=13,x=13; NEXT i
1180 FOR i=1 TO 100; NEXT i; FOR i=1 TO 30; PLOT a+a=4,49; DRAW INK 2;y=13,x=13;
; NEXT i
1190 PRINT INK 2; PAPER a;at 14,a-1;"I"; PRINT INK 2; PAPER a;at 14,a+3;"I"
;
PRINT INK 2;at 15,a;"EGG"; PRINT INK 0; PAPER 2;at 14,a;"CH5"
1200 INPUT "DO YOU WANT ANOTHER EGG?Y/N";y
1210 IF y="Y" THEN CLS ; GO TO 4
1220 IF y="N" THEN RANDOMIZE USR 0
1230 GO TO 1040
1240 RETURN
1250 PRINT at 9,0;" "; PRINT at 10,1;" "; LET a=a
+CHASHEAT;
1260 PRINT INK 1; PAPER a; FLASH 1;at 10,0;"CONGRATULATIONS";at 12,2;"GO ONTO Y
OUR NEXT VISIT"; FLASH 0
1270 FOR a=0 TO 12 STEP 2; BEEP .25,a; NEXT a
1280 CLS
1290 GO TO 5
1300 PLOT 0,63; DRAW 25,0
1310 FOR i=27 TO 1 STEP -1; PRINT at 12,i; INK INT (1/80+1)"CH6 "; PAUSE 5; NE
X i;"

```



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- |                   |            |              |
|-------------------|------------|--------------|
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| 2 Jet Set Willy   | Surfjack   | Spectrum 128 |
| 3 Beach Head      | G.S. Games | Spectrum 128 |
| 4 Monty Men       | Orion      | Spectrum 128 |
| 5 Calamus Lane    | Quint      | Spectrum 128 |
| 6 Summer Games    | Quint      | Orion 128    |
| 7 Pyramids        | Micro-Gem  | Spectrum 128 |
| 8 Space Invaders  | Orion      | Spectrum 128 |
| 9 Galaxy          | G.S. Games | Orion 128    |
| 10 Spectrum Ace   | G.S. Games | Orion 128    |

### NON-ARCADE

- |                       |                |              |
|-----------------------|----------------|--------------|
| 1 Star Trek           | Atari          | BBC 16       |
| 2 Star Trek           | Malbourne Int. | Spectrum 128 |
| 3 Twin Dragon Valley  | Bug-Bits       | Spectrum 128 |
| 4 American Football   | Mind Games     | Spectrum 128 |
| 5 Harpoon             | Malbourne Int. | Spectrum 128 |
| 6 Seaquest Machine    | Atari          | Spectrum 128 |
| 7 American Football   | Mind Games     | Orion 128    |
| 8 All or Nothing      | Atari          | Spectrum 128 |
| 9 Star Trek           | Bug-Bits       | Orion 128    |
| 10 World Cup Football | Atari          | Orion 128    |

Compiled with the assistance of Britain's leading software distributors, including: Pinnacle, SDL, FCE, Websters, FCE and Software Centre.

### SPECTRUM

- |                   |                    |
|-------------------|--------------------|
| 1 Galaxy Warriors | Orion 128          |
| 2 Jet Set Willy   | Surfjack           |
| 3 Beach Head      | New Generation 128 |
| 4 Monty Men       | Orion 128          |
| 5 Calamus Lane    | Quint 128          |
| 6 Summer Games    | Quint 128          |
| 7 Pyramids        | Micro-Gem 128      |
| 8 Space Invaders  | Orion 128          |
| 9 Galaxy          | Orion 128          |
| 10 Spectrum Ace   | Orion 128          |

### COMMODORE 64

- |                       |                |
|-----------------------|----------------|
| 1 Football Manager    | Atari 128      |
| 2 Star Trek           | Malbourne Int. |
| 3 Twin Dragon Valley  | Bug-Bits       |
| 4 American Football   | Mind Games     |
| 5 Harpoon             | Malbourne Int. |
| 6 Seaquest Machine    | Atari          |
| 7 American Football   | Mind Games     |
| 8 All or Nothing      | Atari          |
| 9 Star Trek           | Bug-Bits       |
| 10 World Cup Football | Atari          |

### DRAGON 32

- |                   |                    |
|-------------------|--------------------|
| 1 Galaxy Warriors | Orion 128          |
| 2 Jet Set Willy   | Surfjack           |
| 3 Beach Head      | New Generation 128 |
| 4 Monty Men       | Orion 128          |
| 5 Calamus Lane    | Quint 128          |
| 6 Summer Games    | Quint 128          |
| 7 Pyramids        | Micro-Gem 128      |
| 8 Space Invaders  | Orion 128          |
| 9 Galaxy          | Orion 128          |
| 10 Spectrum Ace   | Orion 128          |

Compiled by M. H. Smith and J. Smith. Figures in brackets are last week's positions.

### VIC-20

- |                   |                    |
|-------------------|--------------------|
| 1 Galaxy Warriors | Orion 128          |
| 2 Jet Set Willy   | Surfjack           |
| 3 Beach Head      | New Generation 128 |
| 4 Monty Men       | Orion 128          |
| 5 Calamus Lane    | Quint 128          |
| 6 Summer Games    | Quint 128          |
| 7 Pyramids        | Micro-Gem 128      |
| 8 Space Invaders  | Orion 128          |
| 9 Galaxy          | Orion 128          |
| 10 Spectrum Ace   | Orion 128          |

### BBC

- |                   |                    |
|-------------------|--------------------|
| 1 Galaxy Warriors | Orion 128          |
| 2 Jet Set Willy   | Surfjack           |
| 3 Beach Head      | New Generation 128 |
| 4 Monty Men       | Orion 128          |
| 5 Calamus Lane    | Quint 128          |
| 6 Summer Games    | Quint 128          |
| 7 Pyramids        | Micro-Gem 128      |
| 8 Space Invaders  | Orion 128          |
| 9 Galaxy          | Orion 128          |
| 10 Spectrum Ace   | Orion 128          |

### Z801

- |                   |                    |
|-------------------|--------------------|
| 1 Galaxy Warriors | Orion 128          |
| 2 Jet Set Willy   | Surfjack           |
| 3 Beach Head      | New Generation 128 |
| 4 Monty Men       | Orion 128          |
| 5 Calamus Lane    | Quint 128          |
| 6 Summer Games    | Quint 128          |
| 7 Pyramids        | Micro-Gem 128      |
| 8 Space Invaders  | Orion 128          |
| 9 Galaxy          | Orion 128          |
| 10 Spectrum Ace   | Orion 128          |



[illegible][illegible]

```

2100 GOTO 47,58,55,56,58,58,53,58,72,58,51,58,53,5
2110 GOTO 2340
2200 POSITION 0,0:PRINT @;GOTO 1421:GOTO 1075:GOTO 800
2300 SOUND 1,128,18,15
2310 FOR #=1 TO 25:NEXT #
2320 SOUND 1,8,8,8:GOTO 1,221,18,15
2330 FOR #=1 TO 25:NEXT #:GOTO 10:GOTO 1,18,8,8
2340 POSITION 0,0:PRINT @;GOTO 1421
2350 GOTO 2700
2700 POSITION 0,0:PRINT @;GOTO 1421:GOTO 1075:GOTO 800
2710 SOUND 1,221,18,15:FOR #=1 TO 25:NEXT #
2720 SOUND 1,8,8,8:GOTO 1,128,18,15:FOR #=1 TO 25:
NEXT #:GOTO 1,8,8,8
2730 POSITION 0,0:PRINT @;GOTO 1421
2740 POSITION 0,0:PRINT @;GOTO 1421
2750 FOR #=231 TO 40:STEP -18:GOTO 1,8,18,15:NEXT
#;GOTO 1,8,8,8
2760 GOTO 2300
2800 IF #=147 THEN 2900
2810 IF #=154 THEN 2900
2820 PRINT @;"?"
2830 GOTO 2900
2840 FOR T=1 TO 20:FOR #=0 TO 4
2850 POKE#*65536+888:FOR #=0 TO 4:GOTO 1
2860 NEXT #;NEXT T
2870 GOTO 2900
2880 FOR T=1 TO 10
2890 POSITION 0,0:PRINT @;GOTO 1421:POSITION 0,T-1
2900 @;" "
2910 SOUND 1,80,18,18:FOR #=0 TO 25:NEXT #
2920 GOTO 2910:GOTO 1
2930 SOUND 1,8,8,8:POSITION 0,18:PRINT @;" "
2940 LINE 1-18:IF LINE THEN 3120
2950 GOTO 2900
3100 LINE 1-8
3110 IF LINE THEN 3130
3120 GOTO 2900
3130 PRINT @;"1:GOTO 0,2,18
3140 POSITION 0,0:PRINT @;"NAME: NAME"
3150 IF #=43 THEN POSITION 0,1:PRINT @;"YOU ARE
THEY:PRINT @;" "
3160 FOR T=1 TO 25:GOTO 1
3170 PRINT @;"1:GOTO 0,2,18:GOTO 0,2,18
3180 PRINT @;" "
3190 PRINT @;" BY A:GOTO 0,2,18
3200 PRINT @;"PRINT @;"PRINT @;"PRINT @;"NAME: "Y;BC
3210 PRINT @;"NAME: "Y;BC
3220 PRINT @;"PRINT @;"PRINT @;"PRINT @;"NAME: "Y;BC
3230 PRINT @;"PRINT @;"PRINT @;"PRINT @;"NAME: "Y;BC
3240 IF #=155:GOTO 14: THEN 290
3250 IF #=155:GOTO 14: THEN 290
3260 GOTO 2900
3180 PRINT @;"GOTO 0,2,18:GOTO 0,2,18:GOTO 0,2,18:FOR
T TO 1
3280 T = GOTO BY 1:PRINT @;"NAME: "Y;BC
3290 T = 1
3300 T = 1: YOU ARE (NAME), A SMALL SQUARE WITH
A VERY LARGE NOSE, YOUR NAME IS "
3310 T = "PRINT @;"YOUR NOSE IS CHANGING ALL
THE SQUARES ON THE PYRAMID INTO"
3320 T = 15:DIFFERENT COLOURS, WHEN YOU JUMP ON A SQUARE
BY IT WILL CHANGE COLOUR "
3330 T = 1: UNEXPECTEDLY COOLY THE NAME ALSO LIVE
ON THE PYRAMID AND HIS NOSE"
3340 T = 15: CHANGING SQUARES AND EATING THEM, HE W
ILL ALSO CHANGE THE SQUARES THAT"
3350 T = "YOU HAVE COLOURED IN BACK INTO THEIR ORIG
INAL COLOUR, WATCH OUT ALSO FOR "
3360 T = "WELL, THAT GOES DOWN THE PYRAMID, IF YOU
JUMP OFF THE PYRAMID YOU LOSE A "
3370 T = "LIFE AND MUST GO ON TO COLOUR THE PYRA
MID FROM THE BOTTOM SQUARE"
3380 T = "WHEN ALL THE SQUARES ARE COLOURED, THEN
GO ON TO ANOTHER PYRAMID."
3390 T = "PRESS START"
3400 IF #=155:GOTO 14: THEN POKE 155,8:GOTO 290
3410 GOTO 2900

```

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# Detecting the outside world



One feature of the 64, even after 14 which is neglected by many, sets it in its share as an interface with the outside world. The major reason for this is exposed: all the ports on the outside that have been prohibited in alternative machines have been designed for the user port and cost will have double figures. They are useful for contact experiments, which make them very worth while, but for the first time one is tempted starting to learn about the machine's features, such interfaces are normally considered to be a large extra expense.

The solution may be found

in looking around the house, or the company, or the nearest ports. There may be difficulty to use to control the outside world. One major current is low, but there is the variety of receiving new channels of information.

The first problem is to find a plug for these ports. C64 attach or paddle plugs while, but they do not connect to all the pins you will use. Plugs are almost impossible to buy so I had to make my own. To make a simple plug, take one inch long piece of the drinking straw, break them together into the correct shape by placing them into one of the ports and wrapping Sellotape around the exposed surface (you can later be added for rigidity).

Through each hole thread a piece of cable with a long length of exposed wire (Machins took up wire is about 1/2 inch). Fold the exposed wire in half, one end going inside the tube for pin contact, and the other end being stuck to the outside of the tube with Sellotape. Make sure none of the wires touch, and if contact is needed put small pieces of foil or wire inside the tube. Finally, wrap Sellotape around the leading edge of the plug until there is a seal to be even it and the port.

Now, you must read the values coming in from the port. There are two types of input: digital (on or off as with the joystick) and analogue (a variable value as produced by a paddle). Digital signals are received through pins 3 and 4 and pin 6 (on the user guide P141) and are treated when those pins are connected to pin 8. To read their values, POKE locations 5020 and 5021 (one byte per pin) where the first five bits of each location give the five pin values, so on for reading the pin is not connected.

The analogue ports behave somewhat differently. To read signals, connect the analogue pins (5 and 9) to +5 Vols (pin 7). These pins generate a resistance between themselves and the power source, so the value read varies between zero and 255, and is found at

locations 5022 and 5023 (one byte per pin).

As you can see, there are four paddle pins, and only two bytes to read them with, creating a problem. This is solved by location 5020. Pins 5 and 9 determine which part the analogue data is received from. However, changing these values interferes with keyboard reading, and as values are received so quickly BASIC is not slow to be used to read the last two paddles. Machins code is perfect, and a short routine is listed here. To run the routine, get SYS 4913, and the byte values of the four pins may be POKE'd from locations 250 to 254 inclusive.

To see the analogue pins you will need a potentiometer with a resistance of 40K ohms. A three-pin rotary potentiometer is best (and cheapest) for initial experiments. To use it, simply connect the centre pin to one of the outer pins and connect the two outer pins to the port as described above.

Now you are ready to open up a whole new world to your computer, ranging from quick, simple reading using potentiometers to control spaces or music to the more diverse (during open windows with a switch, for fast saving or to be shared). The range of uses is endless, and all you need is imagination, programming and some cable.

## Listing

### + REMAPOT READ ROUTINE+

```
10 FORM=0T055
20 READR
30 FORB=49152+H-A
40 NEXTH
50 END
100 DATA128,173,2,229,179,169,192
110 DATA41,2,229,169,64,141,228
120 DATA168,255,134,255,253,173,25,212
130 DATA133,251,178,28,212,189,252
140 DATA69,128,141,229,169,255,176
150 DATA268,253,173,25,12,133,253
160 DATA173,25,212,133,254
170 DATA138,141,2,228,68,96
```



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